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Performance of Global Climate Models on High-Performance Parallel Architectures

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We discuss the performance of oceanic, atmospheric, and coupled ocean/atmosphere general circulation models on high-performance massively parallel architectures. The oceanic and atmospheric component models, which we have developed from established finite-difference programs, achieve parallelization through a domain-decomposition message-passing approach. Coupling is achieved through a comprehensive framework design, in which individual packages typically run concurrently, with the machine processing elements partitioned between the packages. The coupled model is portable across a variety of leading-edge parallel architectures. Our primary computing platform over the past year has been the Cray-T3D, where we have made extensive use of the shared memory communications library (SHMEM). We have also been utilizing the Meiko-CS2 and the IBM-SP2. Recent optimization efforts have focussed on load-balancing. We will present our latest performance results.

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